MotoReva

Tool # MT-112

Cam Belt Harmonic Meter

General Usage Notes and Suggestions

Principle of Operation

The MotoReva cam belt harmonic meter takes an acoustic measurement of the vibrations of a strummed cam belt and "counts" the vibrations over a set time period to determine the frequency of vibration. The frequency of vibration of the belt is a function of the belt tension. The greater the tension of the belt, the greater the resonant frequency of vibration.

Basic Use:

The probe jack connector should be installed in the receptacle located on the LCD end of the meter body.

The meter has a momentary ON button located on the LCD end of the meter body. When this button is depressed and released, the meter will be powered ON and run through a start up mode. During the brief start up mode, the LCD will display "888." After the start up sequence, the LCD screen will display the following:

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The presence of the 3 dashes indicates that the meter is listening for a sound corresponding to a strummed cam belt.

When the meter has acquired an acceptable sound imprint, it will briefly display a corresponding frequency count in Hz on the LCD display, such as the example shown below:

1	1	0

After approximately 1 second, the LCD display will revert to the dashes while waiting for another sound imprint.

If the meter receives a sound input that is other than a good strum input, it will display the following on the LCD:

The meter will continue to listen for sound imprints and display the frequency count as long as it receives sound inputs. After 10 seconds of not receiving sound inputs, the meter will automatically turn itself OFF. The momentary power button may also be depressed and then released to turn OFF the power.

Usage Notes and Tips

The meter software cannot distinguish between a strummed belt and other sounds that are between 50 and 400 Hz, so it is usually necessary to be quiet while taking the measurements. Background noise can affect the measurement.

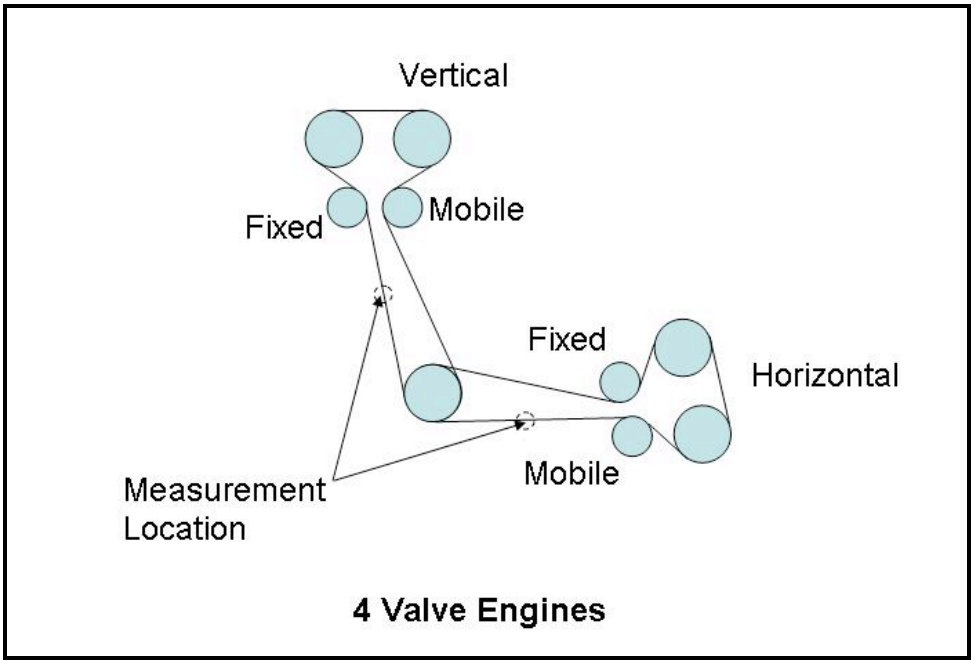
When the cam belts are very loose and the harmonic frequency of the strummed belts is below 60 Hz, the meter readings may be slightly erratic. This is due to the belts not having enough tension to set up a clean harmonic resonance.

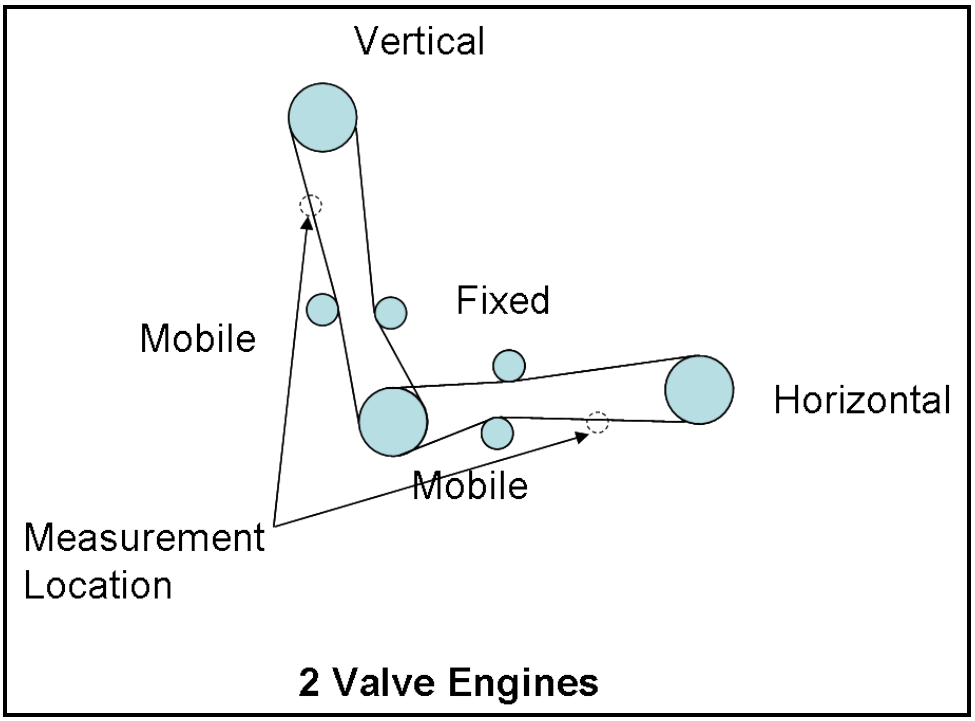
The meter software has been configured to reject any sound input readings that are below 50 Hz and above 400 Hz.

When the battery reaches a discharge condition, the LCD will display "bAt" as an indication that the 9VDC battery should be replaced.

Where to Take the Reading

The measurement point for the belts is on the "outside" of the 90 degree v of the engine as shown in the images below (which depict a 4 and 2 valve head engine layout). Note that the measurement point is the halfway point between the cam belt drive pulley and the next pulley as depicted.

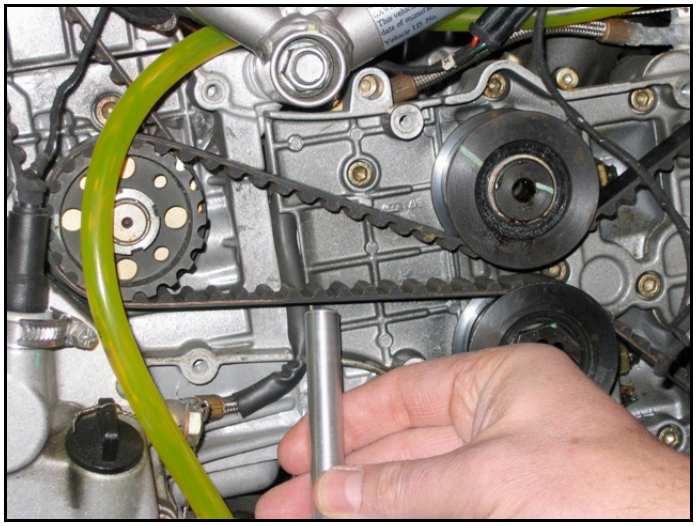




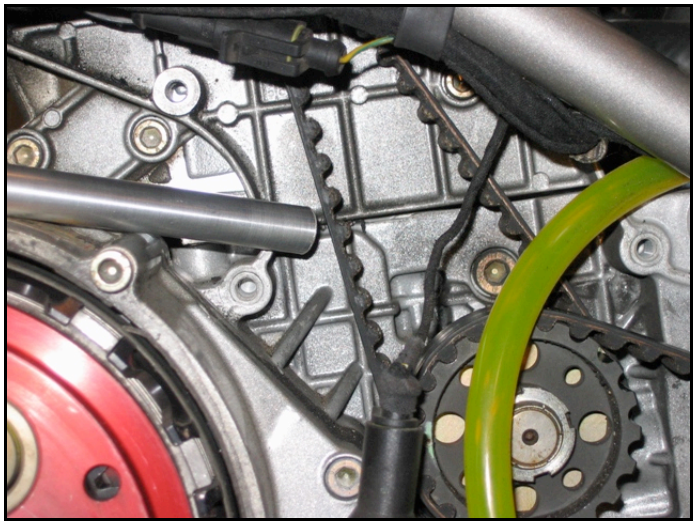
How to Take a Belt Reading

Referring to the service manual for your motorcycle, make sure the cylinder which you want to make the belt measurement on is at top dead center (TDC) on the combustion stroke. This ensures that the small valve closing springs aren't exerting any pressure on the cam lobes and thereby potentially affecting the belt tension measurement.

The probe end should be placed close, but not touching the smooth flat face of the cam belt, as shown below. The sound coming from the toothed side of the belts does not uniformly produce acceptable sound inputs. The probe should be placed, as much as possible, over the flat part of the belt and not on the edge. The meter body should be place nearby to make it easy to see the LCD while taking the measurements.

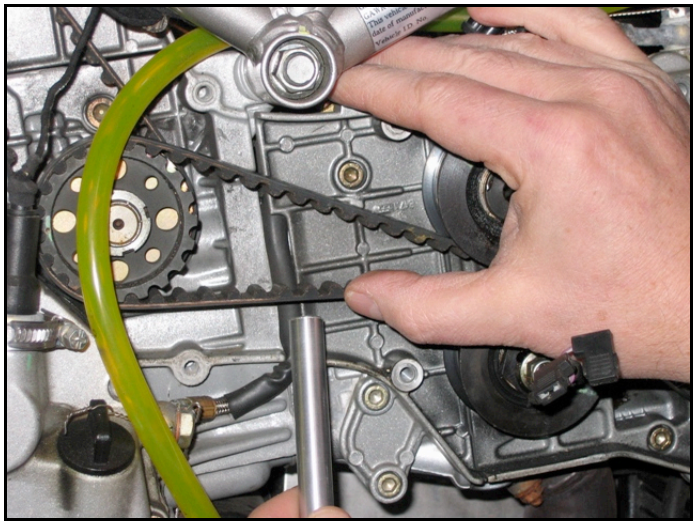


Horizontal Belt Measurement Position



Vertical Belt Measurement Position

After positioning the probe, strum the belt as shown in the image as shown below. There is a bit of skill in strumming the belt and the best way to develop the skill is to practice the strumming and note the frequency measurement. When you can achieve a repeatable value (within a few Hz) each time you have strummed the belt, you have developed the correct technique.



Strumming the Belt

After each belt strumming, the meter LCD will display the measurement result for approximately 1 second and then revert to listening for the next strum input.

Since the meter is running in a continuous mode, it is necessary to wait until the “dashes” are present on the LCD to again strum the belt.

We have noticed that if the belt is strummed too forcefully, it is possible to generate false sound inputs. Conversely, too light of a strum may not excite the resonant frequency properly.

Belt Tension

We strongly recommend that you acquire an OEM service manual or one of the Desmo Times maintenance guides for the specific procedure of adjusting the cam belt tension on your specific Ducati model. There are some differences in procedure and belt tension settings amongst the various models.

However, *in general*, new belts should be adjusted to produce a harmonic reading of 110 ± 5 Hz using the mobile pulley. According to Ducati mechanics we've spoken to, belts that have seen use on an engine can be safely set between 80 and 100 Hz.

Trouble Shooting

Problem	*Resolution*
Unit Fails to Turn ON	Ensure that a charged battery is installed; Ensure that battery connection is securely attached to battery; Remove and replace the battery as needed.
Unit Displays “888”	Remove and replace the battery to reset unit.
Unit Fails to Display Readings	Check to make sure the probe jack connector is fully seated in receptacle on meter body.

For other problems, please contact MotoReva via the website contact form for assistance in resolving the issue.

Specifications

Frequency Range	50 to 400 Hz
Microphone Element	Electret, omni-directional
Battery Type	9VDC Alkaline, type PP3
Battery Life	Approximate 10 hours of active measurement usage
Storage Temperature	0 to 70 C, non condensing humidity
Operating Temperature	5 to 50 C, non condensing humidity